

**Amendments to Claims**

This listing of claims will replace all prior revisions and listings of claims in this application.

**Listing of Claims**

1. **(Currently Amended)** A method comprising:

generating a phase-shift keyed optical signal; and

propagating the phase shift keyed optical signal through a semiconductor optical amplifier in deep saturation, such that an optical signal exhibiting a regulated, amplified optical power is produced;

wherein the amplified optical power is regulated to a saturation output power such that  $\Delta P_{OUT}(dB)/\Delta P_{IN}(dB)$  of the optical amplifier is less than  $[[about]] 0.25$ , wherein  $P_{OUT}$  is the power of the optical signal output from the amplifier, and  $P_{IN}$  is the power of the optical signal input into the amplifier.

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2. **(Previously presented)** The method of claim 1, wherein the amplified optical power is regulated to about the saturation output power of the semiconductor optical amplifier.

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3. **(Previously Presented)** The method of claim 1, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

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4. **(Original)** The method of claim 1, wherein the optical signal has a data-independent intensity profile.

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5. **(Original)** The method of claim 1 wherein the optical signal is RZ-DPSK signal.

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6. **(Original)** The method of claim 1, wherein the optical signal is an  $\pi/2$ -DPSK signal.

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7. **(Original)** The method of claim 1, wherein the optical signal is a constant-intensity DPSK signal.

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8. **(Original)** The method of claim 1, wherein the optical signal is an RZ-DQPSK signal.

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9. **(Cancelled)**

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10. **(Currently Amended)** A method for optical limiting amplification comprising:

inputting a phase-shift keyed optical signal having a data independent intensity profile into a semiconductor optical amplifier in a deep saturation regime such that an optical signal exhibiting a regulated, amplified optical power is produced and output, wherein  $\Delta P_{OUT}(dB) / \Delta P_{IN}(dB)$  is less than [[about]] 0.25, where  $P_{OUT}$  is the power of the optical signal output from the amplifier, and  $P_{IN}$  is the power of the optical signal input into the amplifier.

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11. **(Previously Presented)** The method of claim 10, wherein a gain recovery time of the optical amplifier is larger than the bit period of the optical signal.

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12. **(Original)** The method of claim 10, wherein the optical signal is an RZ-DPSK signal.

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13. **(Original)** The method of claim 10, wherein the optical signal is an  $\pi/2$ -DPSK signal.

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14. **(Original)** The method of claim 10, wherein the optical signal is a constant-intensity DPSK signal.

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15. **(Original)** The method of claim 10, wherein the optical signal is an RZ-DQPSK signal.

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16. (Cancelled)

17. (Currently Amended) An optical signal processor apparatus comprising:

a semiconductor optical amplifier device adapted to operate in deep saturation and to receive an RZ-DPSK optical signal having an amplitude-shift keyed optical label portion, such that the optical label portion of the signal is removed upon propagation through the semiconductor optical amplifier device;

wherein  $\Delta P_{OUT}(dB)/\Delta P_{IN}(dB)$  is less than [[about]] 0.25, where  $P_{OUT}$  is the power of the optical signal output from the amplifiers, and  $P_{IN}$  is the power of the optical signal input into the amplifiers.

18. (Cancelled)

19. (Currently Amended) An optical communication system for transmitting multi-channel phase-shift keyed optical signals comprising:

a plurality of semiconductor optical amplifiers,

wherein the system is adapted to transmit the optical signals such that the plurality of semiconductor optical amplifiers operate in a deep saturation regime so as to provide optical power equalization of a plurality of channels of the multi-channel optical signals,

wherein  $\Delta P_{OUT}(dB)/\Delta P_{IN}(dB)$  is less than [[about]] 0.25, where  $P_{OUT}$  is the power of the optical signal output from the amplifiers, and  $P_{IN}$  is the power of the optical signal input into the amplifiers.

20. (Currently Amended) An apparatus comprising:

a means for generating a phase-shift keyed optical signal; and

a means for propagating the optical signal through a semiconductor optical amplifier in deep saturation to regulate the amplified optical power;

wherein  $\Delta P_{OUT}(dB) / \Delta P_{IN}(dB)$  is less than [[about] 0.25, where  $P_{OUT}$  is the power of the optical signal output from the amplifiers, and  $P_{IN}$  is the power of the optical signal input into the amplifiers.